

This article was downloaded by: [89.132.92.250]

On: 19 February 2013, At: 02:14

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Journal of Psychoactive Drugs

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/ujpd20>

### Illicit Use of LSD or Psilocybin, but not MDMA or Nonpsychedelic Drugs, is Associated with Mystical Experiences in a Dose-Dependent Manner

Michael Lyvers Ph.D.<sup>a</sup> & Molly Meester Honours (Psychology)<sup>a</sup>

<sup>a</sup> Department of Psychology, Bond University, Gold Coast Queensland, Australia

Version of record first published: 06 Dec 2012.

To cite this article: Michael Lyvers Ph.D. & Molly Meester Honours (Psychology) (2012): Illicit Use of LSD or Psilocybin, but not MDMA or Nonpsychedelic Drugs, is Associated with Mystical Experiences in a Dose-Dependent Manner, Journal of Psychoactive Drugs, 44:5, 410-417

To link to this article: <http://dx.doi.org/10.1080/02791072.2012.736842>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

# Illicit Use of LSD or Psilocybin, but not MDMA or Nonpsychedelic Drugs, is Associated with Mystical Experiences in a Dose-Dependent Manner

Michael Lyvers, Ph.D.<sup>a</sup> & Molly Meester, Honours (Psychology)<sup>b</sup>

**Abstract** — Psychedelic drugs have long been known to be capable of inducing mystical or transcendental experiences. However, given the common “recreational” nature of much present-day psychedelic use, with typical doses tending to be lower than those commonly taken in the 1960s, the extent to which illicit use of psychedelics today is associated with mystical experiences is not known. Furthermore the mild psychedelic MDMA (“Ecstasy”) is more popular today than “full” psychedelics such as LSD or psilocybin, and the contribution of illicit MDMA use to mystical experiences is not known. The present study recruited 337 adults from the website and newsletter of the Multidisciplinary Association for Psychedelic Studies (MAPS), most of whom reported use of a variety of drugs both licit and illicit including psychedelics. Although only a quarter of the sample reported “spiritual” motives for using psychedelics, use of LSD and psilocybin was significantly positively related to scores on two well-known indices of mystical experiences in a dose-related manner, whereas use of MDMA, cannabis, cocaine, opiates and alcohol was not. Results suggest that even in today’s context of “recreational” drug use, psychedelics such as LSD and psilocybin, when taken at higher doses, continue to induce mystical experiences in many users.

**Keywords** — LSD, MDMA, mystical experiences, psilocybin, psychedelic drugs, religious experiences

When taken in sufficient doses the psychedelic drugs LSD and psilocybin have been widely reported to elicit mystical or transcendental religious/spiritual experiences

(e.g., Harris 2011; Griffiths et al. 2006; Hasler et al. 2004; Horgan 2003; Smith 2000; Bakalar 1985; Hofmann 1983; Pahnke 1969, 1963; Pahnke & Richards 1966; Watts 1965; Leary 1965; Maslow 1964). Insights into God or Ultimate Reality, transcendence of the personal ego, merging with the cosmos and undergoing transformative death and rebirth are common elements of the mystical experiences reported by many of those who have taken high doses of LSD or psilocybin. Such reports resemble in some respects the classical descriptions of self-realization or enlightenment arising from the mystical traditions of

---

The authors would like to thank Rick Doblin and MAPS for their assistance with this project.

<sup>a</sup>Associate Professor of Psychology, Department of Psychology, Bond University, Gold Coast Queensland, Australia.

<sup>b</sup>Student Researcher, Department of Psychology, Bond University, Gold Coast Queensland, Australia.

Please address correspondence to Michael Lyvers, Department of Psychology, Bond University, Gold Coast Queensland 4229, Australia; email: mlyvers@bond.edu.au

major religions such as Buddhism and Hinduism (Horgan 2003; Grinspoon & Bakalar 1979; Watts 1965; Suzuki 1957; James 1905).

Psychedelic drugs are potent direct serotonin agonists (Jacobs 1987) that can induce powerful activation of the cerebral cortex, especially the prefrontal region (Vollenweider et al. 1997). Although the peak in popularity of psychedelics, particularly LSD, was in the 1960s, psychedelic drugs are still taken illicitly today but the purposes of present-day use can be quite different from the motives of typical LSD users in the 1960s. Today psychedelics are often used to enhance sensory experiences at concerts and dance parties—in contrast to the ego-transcending or “mind-expanding” goals of most psychedelics users in the 1960s. This change is reflected in the typical unit doses of LSD available on the black market today, which are considerably lower than the typical unit doses available in the 1960s (Laing & Siegel 2003). Black market unit samples of LSD in both the U.S. and Europe in the 1960s often contained several hundred micrograms (see [erowid.org/chemicals/lsd/lsd\\_history1.shtml](http://erowid.org/chemicals/lsd/lsd_history1.shtml)), a dose range characterized as “strong” or “heavy” by the popular drug use information website [erowid.org](http://erowid.org); by contrast in the past decade typical black market LSD unit doses averaged only about 50 micrograms (Hidalgo 2009; Laing & Siegel 2003), a dose range characterized by [erowid.org](http://erowid.org) as “light” and said to be well below the threshold for a revelatory mystical psychedelic experience (Stafford 1983). Moreover the most commonly used drug with psychedelic properties today is not LSD or psilocybin but MDMA (“Ecstasy”), which induces a mix of stimulant and mild psychedelic effects that are reported to be less intense and more controllable than those induced by “full” psychedelics such as LSD and psilocybin (Rushkoff 2001). LSD and psilocybin are often referred to as “entheogens,” meaning “to awaken God within,” whereas MDMA is often described as an “entactogen,” meaning “to touch within” (Bravo 2001; Smith 2000), reflecting the differences between MDMA and “full” psychedelics.

Pahnke (1963) and Griffiths and colleagues (2006) demonstrated that a strong dose of psilocybin administered in a controlled, supportive experimental setting can induce profound mystical experiences in drug-naïve subjects, with self-reported transformative effects that for some have lasted decades (Doblin 1991). The present study examined mystical experiences in relation to illicit drug use among a sample of “recreational” psychedelic and other drug users. Given that psychedelic drug dose is said to be a crucial factor influencing whether an occasion of use is capable of catalyzing a transformational mystical experience, we expected to find that the usual dosage taken as reported by users for the full psychedelics LSD and psilocybin, but not MDMA or nonpsychedelic drugs such as cannabis, cocaine, opiates or alcohol, would be positively related to self-reported mystical experiences as well as to experiences

of an “overwhelming” nature. Scores on the Depression Anxiety and Stress Scales (DASS-21) served as a control for the potential influence of mild psychopathology on such self-reports. In addition, self-report measures of specific life values and empathy were examined, as a previous cross-cultural study found that psychedelic drug users rated the life values of spirituality, creativity, concern for the environment and concern for others more highly than did nonusers (Lerner & Lyvers 2006), a difference which the authors speculated might be a result of mystical experiences in the former group. Mindfulness was also examined given the foundation of that concept in the mystical Zen Buddhist tradition (e.g., Maezumi & Glassman 2007).

## METHOD

### Participants

Participants were recruited online from members of the Multidisciplinary Association for Psychedelic Studies (MAPS) and those who visited its website ([www.maps.org](http://www.maps.org)). MAPS is a nonprofit organization promoting research on potential medical and psychiatric applications of marijuana and psychedelic drugs. A monthly newsletter emailed to MAPS members in April 2011 contained a brief description of the online survey and a link to it. This information was also placed on the MAPS website. The total number of participants who completed the survey was 350, with 337 providing usable data. Among these 337 participants, ages ranged from 16 to 79 years ( $M = 29.12$  years,  $SD = 12.14$ ), and 68.5% were male. The majority (68%) reported having a university degree; 32% of participants were students, and 58% of participants were employed full-time.

Approval was obtained from the Bond University Human Research Ethics Committee prior to the commencement of the study. No incentive was offered for participation.

### Materials

To commence the online survey administered via Survey Monkey, each participant had to read an explanatory statement which assured them of the anonymity of their data, and informed them of their right to withdraw from the study at any time without consequence. The following questionnaires comprised the survey.

**Demographics and Drug Use Questionnaire.** This measure was created for this study and asked for the participants' age, gender, education, occupation, and personal history of use of alcohol and illegal drugs including cannabis (marijuana), MDMA (Ecstasy), cocaine, opiates, LSD and psilocybin. Participants were asked to estimate their frequency of use on a six-point scale where 0 = “never,” 1 = “rarely,” 2 = “monthly,” 3 = “fortnightly,” 4 = “weekly,” and 5 = “daily.” They were also asked to estimate their usual dosage taken on a four-point

scale where 0 = “none,” 1 = “low dose,” 2 = “common dose,” and 3 = “strong dose.” Participants were also asked if they had ever had an overwhelmingly intense experience of any kind—not necessarily drug induced but could include drug experiences—by ticking either “yes” or “no.” For those who indicated they had used psychedelics, a question asked for the participant’s motives for such use.

**Mysticism Scale.** This 32-item questionnaire (Hood 1975) contains items that ask participants about past mystical experiences (if any). The Mysticism Scale has been used in research on the psychology of religion (Spilka et al. 2003) but has only previously been applied to drug experiences by Griffiths and colleagues (2006), who used it to assess psychedelic drug (psilocybin) experiences. The Mysticism Scale yields a total score based on three dimensions of mystical experience: noetic quality (e.g., “I have never experienced anything to be divine,” reverse-scored); introvertive mysticism (e.g., “I have never had an experience which I was unable to express adequately through language,” reverse-scored); and extrovertive mysticism (e.g., “I have had an experience in which I felt everything in the world to be part of the same whole”). The items are rated on a nine-point scale ranging from  $-4$  = “this description is extremely not true of my own experience or experiences” through  $0$  = “I cannot decide” to  $+4$  = “this description is extremely true of my own experience or experiences.” The psychometric properties of this scale have been reported to be sound (Reinert & Steifler 1993).

**States of Consciousness Questionnaire.** The SCQ (Griffiths et al. 2006) contains 100 items pertaining to states of consciousness and mood, but only the 43 items of the Pahnke-Richards Mystical Experience Questionnaire (MEQ; Pahnke 1969; Richards 1975) are scored, with the remainder being distractor items. The MEQ was used in Pahnke’s 1966 Good Friday experiment as well as in the subsequent psilocybin study by Griffiths and colleagues (2006), the latter in the form of the SCQ as in the present study. The MEQ assesses experiences of internal unity, external unity, transcendence of time and space, ineffability, paradoxicality, sacredness, noetic quality, and positive mood. Participants rated each statement on a six-point Likert scale for degree of having experienced the phenomenon listed, from  $0$  = “not at all” to  $5$  = “extreme.” A sample item is “sense of profound humility before the majesty of what was felt to be sacred or holy.” Total scores can range from  $0$  to  $215$ .

**Balanced Emotional Empathy Scale.** This scale (BEES; Mehrabian 1996) assesses one’s perceived ability to identify and feel the emotions of others. Participants rate 30 items on a nine-point Likert scale where  $-4$  = “very strong disagreement,”  $0$  = “neither agreement or disagreement,” and  $+4$  = “very strong agreement” with each item. A sample item is “I am moved deeply when I observe strangers who are struggling to survive.” Research has indicated that the BEES has good to excellent internal

consistency, convergent validity and predictive validity (Mehrabian, Young & Sato 1988; Mehrabian & Epstein 1972).

**Life Values Inventory.** The LVI (Crace & Brown 1996) uses 42 items to measure 14 different life values that are rated for personal importance on a five-point Likert scale, where  $1$  = “almost never guides my behavior,”  $3$  = “sometimes guides my behavior” and  $5$  = “almost always guides my behavior.” The 14 life values are achievement, belonging, concern for the environment, concern for others, creativity, financial prosperity, health and activity, humility, independence, loyalty to family or group, privacy, responsibility, scientific understanding, and spirituality. Brown and Crace reported high test-retest reliability for the 14 life values ranging from  $.78$  to  $.97$ . For the purpose of this study only creativity, spirituality, concern for the environment, and concern for others were examined, based on previous findings described earlier above (Lerner & Lyvers 2006).

**Langer Mindfulness Scale.** The LMS (Langer 2004) assesses the construct of mindfulness as practiced in everyday life. Participants rate 21 items in reference to their personal outlook on a five-point Likert scale where  $1$  = “strongly disagree,”  $3$  = “neutral,” and  $5$  = “strongly agree.” There are four subscales, novelty-seeking, engagement, novelty-producing, and flexibility; as these have been found to load onto a single scale score, only the total score was used in the present study.

**Depression Anxiety and Stress Scales.** The DASS-21 (Lovibond & Lovibond 1995) is comprised of 21 items concerning negative mood states experienced in the past week, rated using a four-point Likert rating scale where  $0$  = “these statements did not apply to me at all,”  $1$  = “applied to me some of the time,”  $2$  = “applied to me a good part of the time,” and  $3$  = “applied to me most of the time.” There are three subscales, depression, anxiety and stress. Items include “I just couldn’t seem to get going” (depression), “I found it difficult to relax” (anxiety) and “I found it hard to wind down” (stress). Normal scores for depression are  $0$ – $9$ , anxiety  $0$ – $7$ , and stress  $0$ – $14$  (Lovibond & Lovibond 1995), with higher scores indicating psychopathology. The psychometric properties of this widely used measure are regarded as excellent (Crawford & Henry 2003).

## Procedure

Participants completed the questionnaires anonymously online via Survey Monkey. Once they opened the link to the present survey on their computer, they first read the explanatory statement. Then, participants clicked “Next,” which directed them to the demographics questionnaire. After the completion of this section, participants proceeded to the other questionnaires. Upon completing the last questionnaire, participants clicked “Finished,” which brought them to a thank you and appreciation page.

## RESULTS

After removal of multivariate outliers and cases with substantial missing data from the dataset, 337 cases remained to provide usable data. Of these 337 participants, 99% reported having used alcohol, 58% reported having used cocaine, 40% reported having used opiates, 96% reported having used cannabis, 74% reported having used MDMA, 83% reported having used LSD, and 89% reported having used psilocybin. The very high proportions of the sample who reported having used cannabis and psychedelics was expected given the nature of MAPS as an advocacy group promoting potential beneficial applications of these substances. However, estimated self-reported frequency of drug use was low in this sample except for use of alcohol and cannabis. The most commonly reported frequency of use for alcohol was "weekly" (35%), whereas for cannabis the most commonly reported frequency of use was "daily" (44%). By contrast, "rarely" (less than monthly) was the most commonly reported frequency of use for cocaine, opiates, MDMA, LSD and psilocybin in this sample. Self-reported doses taken showed a broader distribution than frequency of use, although "common" was the most frequently cited dose level with frequencies ranging from 13% to 45% for this dose category; the exceptions were cocaine and opiates, for which the most commonly cited quantity was "none" (these drugs having the lowest proportion of users in the sample; see above). DASS depression, anxiety and stress scores were quite low in this sample, averaging only three or four out of a possible 21. Among those who reported having used psychedelics and provided motives for use, the most common self-reported motive for use was "mind expansion" (41%), followed by "spiritual" (25%), "curiosity" (13%) and "recreation" (7%), with the remainder citing "other."

Intercorrelations among the measures of interest were calculated and are presented in Table 1. Illicit drug doses were all intercorrelated as expected, such that self-reported use of higher doses of any one drug were associated with self-reported use of higher doses of other drugs as well. LSD dose was significantly positively correlated with scores on the Mysticism Scale, MEQ, and LVI Creativity. Psilocybin dose was significantly positively correlated with Mysticism and MEQ scores. The other illicit drugs (cocaine, cannabis, opiates, MDMA) showed only small to no correlation with any of the scales, and none with Mysticism or MEQ scores. Alcohol dose was significantly negatively correlated with BEES empathy scores and three of the five LVI values: environmental concern, concern for others, and spirituality. Participant age was significantly negatively related to all self-reported drug doses except cocaine, and significantly positively related to BEES empathy, LVI environmental concern and LVI spirituality.

Several of the scales were significantly intercorrelated in expected ways. For example, BEES empathy scores were

positively correlated with LVI concern for others; LVI spirituality scores and LMS mindfulness were positively correlated with each other and with Mysticism, MEQ, BEES, and LVI concern for others, creativity and environmental concern; and the DASS scales were all intercorrelated as usual (e.g., Lyvers et al. 2010) although interestingly they did not significantly correlate with any other measure including drug use indices (see Table 1).

Hierarchical regression was used to assess predictors of the primary criterion measures of interest, i.e., Mysticism Scale scores and MEQ scores, examining the possible roles of LSD and psilocybin dose after controlling for demographic variables, mood variables, and self-reported doses of drugs other than LSD or psilocybin. In these regressions age, gender and education level were entered at step 1, followed by DASS depression, anxiety and stress scores at step 2, self-reported doses of alcohol, cannabis, cocaine, opiates and MDMA at step 3, and self-reported doses of LSD and psilocybin at step 4. For prediction of Mysticism Scale scores the regression model was only significant at step 4,  $F(13, 291) = 2.79, p < .001$ ; the addition of psychedelic drugs at step 4 accounted for 11% of the variance in Mysticism Scale scores,  $Fchange(2, 291) = 10.60, p < .0001$ . The only significant drug predictors of Mysticism scale scores were LSD dose,  $\beta = .23, p < .0001$ , and psilocybin dose,  $\beta = .13, p = .04$ . No other predictors approached significance except for age at step 4 only,  $\beta = .14, p = .02$ . For MEQ scores as the criterion the results were very similar; again the regression model was only significant at step 4,  $F(13, 291) = 3.12, p < .0001$ , and the addition of psychedelic drugs at step 4 explained 12% of the variance in MEQ scores,  $Fchange(2, 291) = 12.60, p < .0001$ . The only significant drug predictor in the final model was LSD dose,  $\beta = .26, p < .0001$ , with psilocybin dose approaching significance,  $\beta = .11, p = .07$ , and age again significant at step 4 only,  $\beta = .13, p = .03$ .

Finally, among drug use variables, only use of drugs with psychedelic properties was significantly related to the report of having ever had an overwhelming experience. Among those who reported ever using LSD ( $n = 280$ ), 89% responded "yes" to the question asking whether they had ever had an overwhelmingly intense experience of any kind, compared to only 68% of those who said they never tried LSD ( $n = 57$ ), a significant association,  $\chi^2(1) = 15.81, p < .0001$ . Similarly, among those who reported ever using psilocybin ( $n = 299$ ), 88% reported having had an overwhelming experience versus only 59% of those who said they had never tried psilocybin ( $n = 37$ ), again a significant association,  $\chi^2(1) = 21.61, p < .0001$ . By contrast there was no relationship between use of the nonpsychedelic drugs alcohol, cocaine, opiates, and cannabis with having ever had an overwhelming experience, all  $p > .20$ ; however use of MDMA, a drug with mixed stimulant and mild psychedelic properties, was significantly related to the report of an overwhelming

**TABLE 1**  
**Pearson Correlations Among Self-Reported Dosage of Drugs Used and Scores on Questionnaires (See Text for Details)**

| Variables                | 1 | 2      | 3     | 4     | 5      | 6      | 7      | 8      | 9      | 10    | 11    | 12    | 13     | 14    | 15    | 16     | 17   | 18    | 19    |
|--------------------------|---|--------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|--------|-------|-------|--------|------|-------|-------|
| 1 Age                    | — | -.31** | -.05  | -.12* | -.22** | -.20** | -.18** | -.21** | .15**  | .08   | .10   | .08   | .24**  | .09   | .04   | .25**  | -.04 | -.06  | -.02  |
| 2 Alcohol                |   | —      | .15** | .03   | .17**  | .20**  | .12*   | .13*   | -.16** | -.09  | -.05  | -.02  | -.16** | -.13* | -.09  | -.18** | .01  | .05   | .06   |
| 3 Cocaine                |   |        | —     | .28** | .18**  | .40**  | .20**  | .23**  | .08    | .06   | .05   | .04   | .03    | .05   | .05   | .01    | .03  | -.10  | .01   |
| 4 Opiates                |   |        |       | —     | .18**  | .19**  | .17**  | .18**  | .03    | .09   | .10   | .12*  | -.02   | .05   | .05   | -.06   | -.03 | -.03  | .05   |
| 5 Cannabis               |   |        |       |       | —      | .13*   | .21**  | .19**  | -.07   | .01   | .04   | .08   | -.05   | -.12* | .03   | .03    | .03  | .07   | .04   |
| 6 MDMA                   |   |        |       |       |        | —      | .38**  | .34**  | .00    | .02   | .08   | .07   | -.04   | .06   | -.01  | -.10   | .04  | -.01  | -.03  |
| 7 LSD                    |   |        |       |       |        |        | —      | .35**  | .01    | .10   | .23** | .26** | .07    | .02   | .16** | .00    | .03  | .08   | .02   |
| 8 Psilocybin             |   |        |       |       |        |        |        | —      | -.01   | .00   | .19** | .19** | .05    | .00   | .00   | -.07   | .09  | .06   | .05   |
| 9 BEES                   |   |        |       |       |        |        |        |        | —      | .35** | .30** | .27** | .25**  | .50** | .18** | .27**  | -.02 | -.05  | -.06  |
| 10 LMS                   |   |        |       |       |        |        |        |        |        | —     | .34** | .33** | .23*   | .31** | .55** | .19**  | .03  | -.01  | .05   |
| 11 Mysticism Scale       |   |        |       |       |        |        |        |        |        |       | —     | .86** | .22**  | .19** | .25** | .40**  | -.03 | -.04  | -.07  |
| 12 MEQ                   |   |        |       |       |        |        |        |        |        |       |       | —     | .22**  | .16** | .28** | .38**  | -.05 | -.05  | -.08  |
| 13 Environmental concern |   |        |       |       |        |        |        |        |        |       |       |       | —      | .49** | .33** | .42**  | -.05 | -.04  | -.04  |
| 14 Concern for others    |   |        |       |       |        |        |        |        |        |       |       |       |        | —     | .30** | .35**  | .02  | -.08  | -.08  |
| 15 Creativity            |   |        |       |       |        |        |        |        |        |       |       |       |        |       | —     | .23**  | .05  | .05   | .03   |
| 16 Spirituality          |   |        |       |       |        |        |        |        |        |       |       |       |        |       |       | —      | .02  | .03   | -.02  |
| 17 Depression            |   |        |       |       |        |        |        |        |        |       |       |       |        |       |       |        | —    | .42** | .64** |
| 18 Anxiety               |   |        |       |       |        |        |        |        |        |       |       |       |        |       |       |        |      | —     | .52** |
| 19 Stress                |   |        |       |       |        |        |        |        |        |       |       |       |        |       |       |        |      |       | —     |

Note: \*  $p < .05$ . \*\*  $p < .01$ .

experience,  $\chi^2(1) = 14.96, p < .0001$ . Of those who said they had tried MDMA ( $n = 249$ ), 85% reported having ever had an overwhelming experience compared to 72% of those who said they had never taken MDMA ( $n = 87$ ). However, use of MDMA was strongly related to use of LSD, with 90% of those who reported ever using MDMA also reporting use of LSD versus only 61% of those who reported never using MDMA,  $\chi^2(1) = 41.00, p < .0001$ ; nearly identical results were obtained for self-reported use of psilocybin by those who reported use of MDMA versus those who did not,  $\chi^2(1) = 28.67, p < .0001$ . Therefore the reports of overwhelming experiences by MDMA users may reflect their use of LSD or psilocybin rather than MDMA. In an attempt to assess this, MDMA use was examined in relation to reports of an overwhelming experience among the 15 participants who said they had never tried LSD or psilocybin, ten of whom reported never using MDMA versus five who reported MDMA use. In this subgroup there was no significant association between MDMA use and reports of an overwhelming experience,  $\chi^2(1) = 1.25, p = .26$ , however given the very small size of this subgroup the lack of significance is not surprising. Of those who said they had used MDMA, three out of five reported having ever had an overwhelming experience versus only three out of ten of those who reported never using MDMA. By contrast among those 57 participants who reported never using LSD, psilocybin use was significantly related to reports of ever having had an overwhelming experience,  $p < .01$ ; likewise among the 37 who reported never using psilocybin, LSD use was significantly related to reports of ever having had an overwhelming experience,  $p < .05$ .

## DISCUSSION

Results were in line with predictions for the two indices of mystical experiences, the Mysticism Scale and the MEQ, the variances of which were significantly explained by self-reported dose of LSD or psilocybin but not of other drugs. Furthermore the self-report of having ever had an overwhelming experience was significantly associated only with self-reported use of drugs with psychedelic properties, i.e., LSD, psilocybin and MDMA, although the latter association may reflect the extremely high overlap between MDMA users and users of the "full" psychedelics LSD or psilocybin in this sample. Mysticism Scale and MEQ scores were significantly highly positively correlated with each other and with all four LVI values (environmental concern, concern for others, creativity and spirituality) as well as with BEES empathy and LMS mindfulness, consistent with expectations based on the mystical traditions of Buddhism and other religions according to which such values, as well as mindfulness, can be lasting sequelae of mystical enlightenment. However, aside from a small positive correlation between self-reported

LSD dose and LVI creativity, there were no significant relationships between self-reported dose of any illicit drug – including psychedelics – and the other LVI values tested, nor with BEES empathy or LMS mindfulness. Alcohol dose was negatively related to BEES empathy and LVI environmental concern, concern for others and spirituality.

The vast majority of the current sample of MAPS members and those who visited the MAPS website reported use of psychedelic drugs. This was expected based on the mission of MAPS, a nonprofit organization dedicated to supporting medical and psychiatric applications of psychedelic drugs as well as MDMA and cannabis. However the vast majority reported only "rare" (i.e., less than once per month) use of such drugs; 74% of LSD users said they "rarely" used LSD, 77% of psilocybin users said they "rarely" used psilocybin, and 69% of MDMA users said they "rarely" used MDMA. This was in contrast to cannabis users, 44% of whom reported "daily" use. Despite the low frequency of use of psychedelic drugs in the sample, self-reported psychedelic dose predicted scores on the two mystical experiences questionnaires as per expectations. The most commonly cited reason given for psychedelic drug use was "mind expansion," although a quarter of psychedelic drug users cited "spiritual" reasons for use. Present findings indicate that, although the 1960s have long passed and black market LSD unit doses have dramatically declined, illicit use of psychedelic drugs LSD and psilocybin is still significantly associated with experiences that can be characterized as mystical, transcendental or spiritual in nature, a relationship which appears to be dose-dependent. Self-reported doses of the quasi-psychedelic drug MDMA, on the other hand, did not predict such experiences in this sample, nor did any other drug examined.

Although LSD and psilocybin have long been recognized as capable of inducing mystical experiences, Horgan (2003) suggested that, as yet, no "psychedelic saints" have emerged from the psychedelic user subculture. Horgan's comment begs the question of how to determine "sainthood" outside of an established religious tradition such as Catholicism. Lerner and Lyvers (2006) found that users of psychedelics such as LSD or psilocybin differed from users of nonpsychedelic drugs such as cannabis in terms of higher empathy scores and higher scores on LVI creativity, spirituality, concern for others and concern for the environment in the former group. The authors speculated that such differences may in part have resulted from psychedelic mystical experiences in the former group. However, in the present study the strong positive relationships between self-reported dose of LSD or psilocybin and scores on the two mystical experience questionnaires, coupled with the lack of relationships between psychedelic drug dose and scores on empathy, spirituality, concern for others and concern for the environment, suggest a different interpretation. For various reasons those who choose to use psychedelic drugs

may on average place greater value on empathy, concern for the environment, creativity, and spirituality than those who do not choose to use psychedelics, as previously found by Lerner and Lyvers in both Israel and Australia, but the present results do not suggest that those differences specifically arise out of psychedelic-induced mystical experiences. Rather the group differences found by Lerner and Lyvers likely reflect the self-selected nature of psychedelic users and their associated subculture, which even today may share many of the values of the “hippie” movement of the 1960s. In mystical religious traditions perhaps the posited relationship between nondrug-induced spiritual enlightenment and “saintly” values—exemplified by the Mahayana Buddhist ideal of the enlightened Bodhisattva as one dedicated to reducing the suffering of all sentient beings—may to a significant extent reflect the nature of the person who undertakes such a rigorous mystical quest through traditional means, typically requiring many years of highly demanding sacrifices and self-discipline in search of ultimate truth, rather than the transient mystical experience of enlightenment per se (Harris 2011).

The present findings that higher self-reported doses of the psychedelic drugs LSD and psilocybin were associated with higher scores on two indices of mystical experiences

should not be interpreted as encouraging psychedelic drug use, much less use of high doses. Although both LSD and psilocybin are physically very safe, the psychological hazards of uncontrolled use can be quite high, as was demonstrated in the 1960s when uncontrolled LSD use was widespread (e.g., Cohen 1970). Panic reactions and “bad trips” followed by post-traumatic stress symptoms such as “flashbacks” were widely reported among casual users of psychedelic drugs in the 1960s, although such reactions tend to be much rarer when the drugs are taken by psychologically stable, mature participants in a supportive, controlled environment (as in the recent study by Griffiths et al. 2006). Nevertheless even in the latter experiment about one third of participants reported “significant fear” (p. 15) during their psilocybin experience. Griffiths and colleagues noted that under uncontrolled conditions such reactions might easily lead to irrational behavior that could be dangerous to the user or to others. Given the unpredictability and intensity of psychedelic drug effects, such drugs should never be taken casually. Any future licit applications of such drugs are likely to be restricted to highly controlled circumstances involving careful screening, preparation and support of those who take these substances for a specific purpose, whether medical or spiritual.

## REFERENCES

- Bakalar, J.B. 1985. Social and intellectual attitudes toward drug-induced religious experience. *Journal of Humanistic Psychology* 24: 45–66.
- Bravo, G.L. 2001. What does MDMA feel like? In: J. Holland (Ed.) *Ecstasy: The Complete Guide*. Rochester, VT: Park Street Press.
- Crace, R.K. & Brown, D. 1996. *Life Values Inventory*. Ann Arbor, MI: Aviat.
- Cohen, S. 1970. *The Beyond Within: The LSD Story*. St. Albans, UK: Paladin.
- Crawford, J.R. & Henry, J.D. 2003. The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Psychology* 4: 111–31.
- Doblin, R. 1991. The Good Friday experiment—a twenty five year follow-up and methodological critique. *Journal of Transpersonal Psychology* 23 (1): 1–28.
- Griffiths, R.; Richards, W.; McCann, U. & Jesse R. 2006. Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance. *Psychopharmacology* 187: 268–83.
- Grinspoon, L. & Balakar, J.B. 1979. *Psychedelic Drugs Reconsidered*. New York: Basic Books.
- Harris, S. 2011. *Drugs and the Meaning of Life*. Available at: <http://www.samharris.org/blog/item/drugs-and-the-meaning-of-life/>
- Hasler, F.; Grimberg, U.; Benz, M.A.; Huber, T. & Vollenweider, F.X. 2004. Acute psychological and physiological effects of psilocybin in healthy humans: A double-blind, placebo-controlled dose-effect study. *Psychopharmacology (Berlin)* 172: 145–56.
- Hidalgo, E. 2009. *LSD Samples Analysis*. Available at: [http://www.erowid.org/chemicals/lsd/lsd\\_article3.shtml](http://www.erowid.org/chemicals/lsd/lsd_article3.shtml)
- Hofmann, A. 1981. *LSD, my Problem Child*. New York: McGraw-Hill.
- Hood, R.W. 1975. The construction and preliminary validation of a measure of reported mystical experience. *Journal for the Scientific Study of Religion* 14: 29–41.
- Horgan, J. 2003. *Rational Mysticism: Dispatches from the Border Between Science and Spirituality*. Boston: Houghton Mifflin.
- Jacobs, B.L. 1987. How hallucinogenic drugs work. *American Scientist* 75: 386–92.
- James, W. 1905/2007. *The Varieties of Religious Experience*. New York: Cosimo.
- Laing, R. & Siegel, J.A. 2003. *Hallucinogens: A Forensic Drug Handbook*. San Diego: Academic Press.
- Langer, E.J. 2004. *Langer Mindfulness Scale User Guide and Technical Manual*. Worthington, OH: IDS Publishing Corporation.
- Leary, T. 1965. The religious experience: Its production and interpretation. In: G.M. Weil; R. Metzner & T. Leary (Eds.) *The Psychedelic Reader*. Secaucus, NJ: Citadel Press.
- Lerner, M. & Lyvers, M. 2006. Values and beliefs of psychedelic drug users: A cross-cultural study. *Journal of Psychoactive Drugs* 38: 143–47.
- Lovibond, S.H. & Lovibond, P.F. 1995. *Manual for the Depression Anxiety Stress Scales*. Sydney, Australia: The Psychology Foundation of Australia.
- Lyvers, M.; Thorberg, F.A.; Ellul, A.; Turner, J. & Bahr, M. 2010. Negative mood regulation expectancies, frontal lobe related behaviors and alcohol use. *Personality and Individual Differences* 48: 332–37.
- Maezumi, T. & Glassman, B. 2007. *The Hazy Moon of Enlightenment*. Somerville, MA: Wisdom Publications.
- Maslow, A. 1964. *Religions, Values and Peak Experiences*. New York: Viking Press.
- Mehrabian, A. 1996. *Manual for the Balanced Emotional Empathy Scale (BEES)*. Monterey, CA: Albert Mehrabian.
- Mehrabian, A. & Epstein, N. 1972. A measure of emotional empathy. *Journal of Personality* 40: 525–43.

- Mehrabian, A.; Young, A.L. & Sato, S. 1988. Emotional empathy and associated individual differences. *Current Psychology: Research & Reviews* 7: 221–40.
- Pahnke, W. 1969. Psychedelic drugs and mystical experience. *International Journal of Psychiatry in Clinical Practice* 5: 149–62.
- Pahnke, W. 1963. Drugs and mysticism: An analysis of the relationship between psychedelic drugs and the mystical consciousness. Doctoral dissertation, Harvard University. Available at: [http://www.maps.org/books/pahnke/walter\\_pahnke\\_drugs\\_and\\_mysticism.pdf](http://www.maps.org/books/pahnke/walter_pahnke_drugs_and_mysticism.pdf)
- Pahnke, W.N. & Richards, W.A. 1966. Implications of LSD and experimental mysticism. *Journal of Religion & Health* 5: 175–208.
- Reinert, D. & Steifler, K. 1993. Hood's Mysticism Scale revisited: A factor-analytic replication. *Journal for the Scientific Study of Religion* 32: 383–88.
- Richards, W. 1975. Counseling, peak experiences and the human encounter with death: An empirical study of the efficacy of DPT-assisted counseling in enhancing the quality of life of persons with terminal cancer and their closest family members. Doctoral dissertation, The Catholic University of America. Ann Arbor, MI: University Microfilms, 75–18, 531.
- Rushkoff, D. 2001. Ecstasy: Prescription for cultural renaissance. In: J. Holland (Ed.) *Ecstasy: The Complete Guide*. Rochester, VT: Park Street Press.
- Smith, H. 2000. *Cleansing the Doors of Perception: The Religious Significance of Entheogenic Plants and Chemicals*. Boulder, CO: Sentient Publications.
- Spilka, B.; Hood, R.W.; Hunsberger, B. & Gorsuch, R.L. 2003. *The Psychology of Religion*. New York: Guilford.
- Stafford, P. 1983. *Psychedelics Encyclopedia*. Los Angeles: Tarcher.
- Suzuki, D.T. 1957/2002. *Mysticism: Christian and Buddhist*. London: Routledge.
- Vollenweider, F.X.; Leenders, K.L.; Scharfetter, C.; Maguire, P.; Stadelmann, O. & Angst, J. 1997. Positron emission tomography and fluorodeoxyglucose studies of metabolic hyperfrontality and psychopathology in the psilocybin model of psychosis. *Neuropsychopharmacology* 16: 357.
- Watts, A. 1965. *The Joyous Cosmology*. New York: Random House.